

REMARKS

The Applicants thank the Examiner for the helpful telephone interview on March 21, 2007. The Claims have been amended in view of the cited prior art and comments by the Examiner.

Claims 1-20 are pending in the application. In the Office Action at hand, those claims are rejected.

Claims 1-20 are rejected under 35 U.S.C. §102(b) as being anticipated by Ichikawa (U.S. 5,266,930A). In response to the Section 102(b) rejection, the Applicants respectfully submit that Claims 1-20, as amended, are not anticipated by Ichikawa. Reconsideration is respectfully requested.

Claim 1, as amended, recites a display assembly mounted inside the headgear to the lower headgear portion to be located below at least one of the user's eyes so as not to obstruct the user's vision. The display assembly can have an adjustable mount and a viewing display mounted to the adjustable mount with direct viewing optics facing the user and positioned inward from the lower headgear portion for displaying information. The direct viewing optics can be located on the adjustable mount in a position for being below the user's eyes so that for normal distance vision, the line of sight passes over the direct viewing optics. The information can be visible when at least one of the user's eyes looks downwardly at the viewing display where the direct viewing optics face and are substantially inline with said at least one of the user's downwardly looking eyes. The display assembly can be configured to be adjustable by the user while the headgear system is worn by the user for changing orientation of the viewing display and the direct view optics. Claim 11, as amended, is a method claim that generally parallels Claim 1, as amended.

Claim 9, as amended, recites a display assembly having a first rotatable joint that is rotatable about a rotatable horizontal axis for allowing the display to be tilted upwardly and downwardly, and a second rotatable joint that is rotatable about a rotatable vertical axis for allowing the display to rotate about the vertical axis. Claim 19, as amended, is a method claim that generally parallels Claim 9, as amended.

Claims 1 and 11 are amended to recite "the display assembly having an adjustable mount and a viewing display mounted to the adjustable mount with direct viewing optics facing the user

and positioned inward from the lower headgear portion for displaying information, the direct viewing optics being located on the adjustable mount in a position for being below the user's eyes so that for normal distance vision, the line of sight passes over the direct viewing optics, the information being visible when said at least one of the user's eyes looks downwardly at the viewing display where the direct viewing optics face and are substantially inline with said at least one of the user's downwardly looking eyes." Furthermore, Claims 9 and 19 are amended to recite "a first rotatable joint that is rotatable about a rotatable horizontal axis for allowing the display to be tilted upwardly and downwardly, and a second rotatable joint that is rotatable about a rotatable vertical axis for allowing the display to rotate about the vertical axis".

Support for these amendments is found at least in FIGs. 1-5 as well as on page 5, line 9, through page 8, line 4, and page 9, lines 6-7 of the Specification as originally filed. No new matter is introduced.

In the present invention, the display assembly can be mounted to the lower headgear portion and have a viewing display mounted to an adjustable mount with direct viewing optics facing the user and positioned inward from the lower headgear portion for viewing information and images inside the headgear. The direct viewing optics can be located on the adjustable mount in a position for being below the user's eyes so that for normal distance vision, the line of sight passes over the direct viewing optics. Such a position does not significantly obscure the user's field of vision of the real world scene. The information and images can be visible when the user's eye looks downwardly at the viewing display where the direct viewing optics are positioned to face and are substantially inline with the downwardly looking eye. By being substantially inline with the downwardly looking eye, the information and images can be seen clearly and with sufficient brightness. If the viewing display is not sufficiently aligned and is at an undesirable angle, the images can be difficult to see or possibly unviewable, due to distortion and significant reduction in viewable brightness of the viewing display. The viewable brightness of a display drops off drastically as you begin viewing at an angle. Sufficient alignment is desired for viewing in daylight. In the present invention, with the direct viewing optics facing and being substantially inline with the downwardly looking eye, the viewing display is viewable at a position of maximum brightness, and the effect of ambient daylight reflecting off the viewing display which can obscure viewing is limited. The display assembly can be compact in

size and the information and images do not have to be projected onto a separate wind screen that must be lowered into position for viewing.

In addition, the display assembly with the direct viewing optics can be adjustable for changing the orientation of the viewing display inside the headgear to compensate for different sized users. For example, referring to the embodiment depicted in FIGs. 1-5, tilting the display 20 up and down relative to the user's 32 head about a first rotatable joint about the horizontal axis H can adjust for the vertical position of the eyes 34 or 36. Rotating the display 20 about a second rotatable joint about the vertical axis V can adjust for the horizontal or lateral position of a particular eye. These adjustments can change the position of the display 20 and the direct viewing optics about two axes of rotation to position the display and the direct viewing optics into an orientation suitable for viewing for a particular location of the eye 34 or 36.

In contrast, Ichikawa discloses in FIG. 1 a helmet 5 having a wind shield 6. A display unit 11 is positioned in the lower portion of the helmet 5 and angled to face away from the user for projecting images onto the wind shield 6 of the helmet 5 for viewing. The windshield 6 forms the viewing display and is positioned outward relative to the lower portion of helmet 5 and must be lowered into position in front of the user's eyes for viewing. In Ichikawa, the user does not view images by looking at direct viewing optics on the display unit 11 inside the helmet 5. Instead, the user has to look at the wind shield 6 which is positioned outward relative to the lower headgear portion, and where the images are projected. Referring to FIG. 23, it is possible that the projected images could be in the normal field of vision and become a distraction. The Examiner has also suggested that the user in Ichikawa can look downwardly into display unit 11 for viewing. However, the display unit 11 has projection optics, not direct viewing optics. As a result, a user looking directly at the display unit 11 instead of the windshield 6 would likely see an image upside down and backwards. In addition, referring to Fig. 1, even if the user were to look downwardly at the display unit 11, it can be seen that the display unit 11 is angled away from the user to generally face the windshield 6 and images would not be viewable. When looking down, the user's eyes are at best at a 70° angle relative to the viewing axis of display unit 11 (extending perpendicularly), resulting in distorted images that are difficult to see clearly. Furthermore, the brightness of the display unit 11 at a 70° angle would likely not be sufficient for viewing purposes, and such an angle would likely also reflect ambient light in a manner that impairs viewing.

The display unit 11 in Ichikawa is mounted to a unit holding member 15 by a horizontal support shaft 18 (FIGs. 2 and 3), which in turn is mounted to the helmet 5 by a horizontal pin 16 that is oriented 90° relative to the support shaft 18. The horizontal support shaft 18 allows the display unit 11 to tilt forward and backward about a first horizontal axis and the horizontal pin 16 allows the display unit 11 to tilt side to side about a second horizontal axis. The display unit 11 can be locked in place by tightening a curved adjusting disk 20 with respect to an adjusting shaft 19 with a screw 21. Column 9, lines 28-31 of Ichikawa discloses that the adjusting disk 20 can be moved forward, backward, to the left or to the right to rock the display unit 11 about horizontal pin 16 and horizontal shaft 18. There is no rotation of the disk 20 or the display 11 about a vertical axis in Ichikawa. A vertical axis as suggested by the Examiner would have to extend along the longitudinal axis of adjusting shaft 19, perpendicular to the axes of both shaft 18 and pin 16. However, such an axis of rotation is prevented by the existence of horizontal pin 16 and horizontal shaft 18.

FIG. 32 of Ichikawa depicts a helmet 5 having left AL and right AR display locations on the wind shield 6 for viewing at left EL and right ER visual point positions. A pair of openings 74a and 74b are also found in the nose guard 74 of the helmet 5. FIG. 34 additionally depicts correcting optical systems, 737 and 738, reflecting mirrors 734, 735, and 736, a beam splitter 733 and a lens 732, which are associated with a display element 731. These components do not form first and second bases as claimed in the present invention since they are positioned within the case body 73a of display 73 as shown in FIG. 33.

Accordingly, Claims 1-20, as amended, are not anticipated by Ichikawa since Ichikawa does not teach or suggest “a display assembly mounted inside the headgear to the lower headgear portion for being located below at least one of the user’s eyes so as not to obstruct the user’s vision, the display assembly having an adjustable mount and a viewing display mounted to the adjustable mount with direct viewing optics facing the user and positioned inward from the lower headgear portion for displaying information, the direct viewing optics being located on the adjustable mount in a position for being below the user’s eyes so that for normal distance vision, the line of sight passes over the direct viewing optics, the information being visible when said at least one of the user’s eyes looks downwardly at the viewing display where the direct viewing optics face and are substantially inline with said at least one of the user’s downwardly looking eyes”, as recited in base Claim 1, as amended, and similarly in Claim 11, as amended, or “the

display assembly having a first rotatable joint that is rotatable about a rotatable horizontal axis for allowing the display to be tilted upwardly and downwardly, and a second rotatable joint that is rotatable about a rotatable vertical axis for allowing the display to rotate about the vertical axis” as recited in Claims 9 and 19, as amended. Furthermore, Ichikawa does not teach or suggest “a rotatable member having at least a partial circular portion that has a snap fit into the circular recess of the base through the entrance slot, the rotatable member being rotatable within the circular recess about the vertical axis”, as recited in Claims 7, 10, and similarly in Claims 17 and 20. As previously pointed out, the display unit 11 and disk 20 in Ichikawa are rotatable about two horizontal axes but no vertical axes. Finally, Ichikawa does not teach or suggest “a second base mounted to the face bar of the helmet for being below a second eye of the user to allow the user to select the position of at least one viewing display by snap fitting an associated rotatable member into the desired base” as recited in Claim 8, and similarly in Claim 18. Therefore, Claims 1-20, as amended, are in condition for allowance. Reconsideration is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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